Bay Delta Conservation Plan
Environmental Coordination Team update

BDCP Environmental Coordination Team (BECT) Meeting
December 8, 2011

Presentation Outline

- BECT-Purpose and History
- Delta Overview
- What is BDCP?
  - Schedule
  - Overview and status of
    - BDCP chapters
    - BDCP Effects Analysis
- The BDCP EIR/EIS
- Identification of Lead, Responsible, & Cooperating Agencies
- Alternatives and Approaches to Modeling
- Next Steps in Environmental Review Process

BECT - Purpose and History

- Informal process
- Includes
  - lead agencies
  - responsible agencies
  - trustee agencies and cooperative agencies
- Goal: Provide key milestone updates

BECT - Key Dates

- June 2010 - Previous BECT meeting
  - Development of screening criteria
  - Formulation of potential alternatives BDCP Highlights
- December 2010
  - Highlights of the BDCP
  - Preliminary range of alternatives
  - Environmental assessment
- August 2011
  - Reinitiated environmental work
  - Continue work on alternatives

BECT - Key Dates

- What occurred between December and August
  - Further development of alternatives
  - Additional modeling efforts
  - Evaluated additional alternative concepts
    - Scenario 6
    - 3,000 cfs capacity
    - Increased delta outflow

Delta Overview

- Legal Delta
- Importance
- Delta Risks

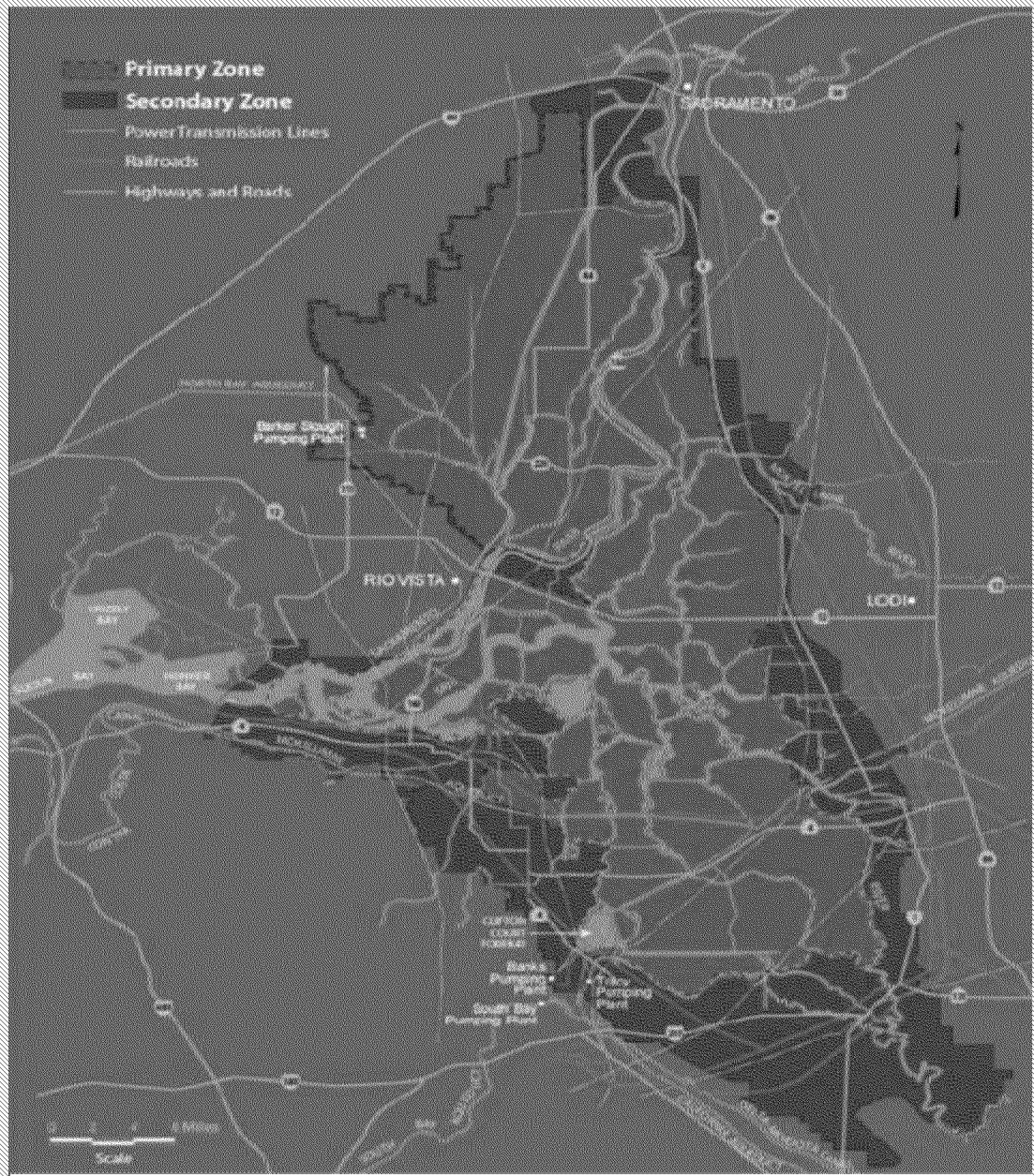
The Legal Delta

738,000 acres

~60 islands/tracts

1,115 miles of levees

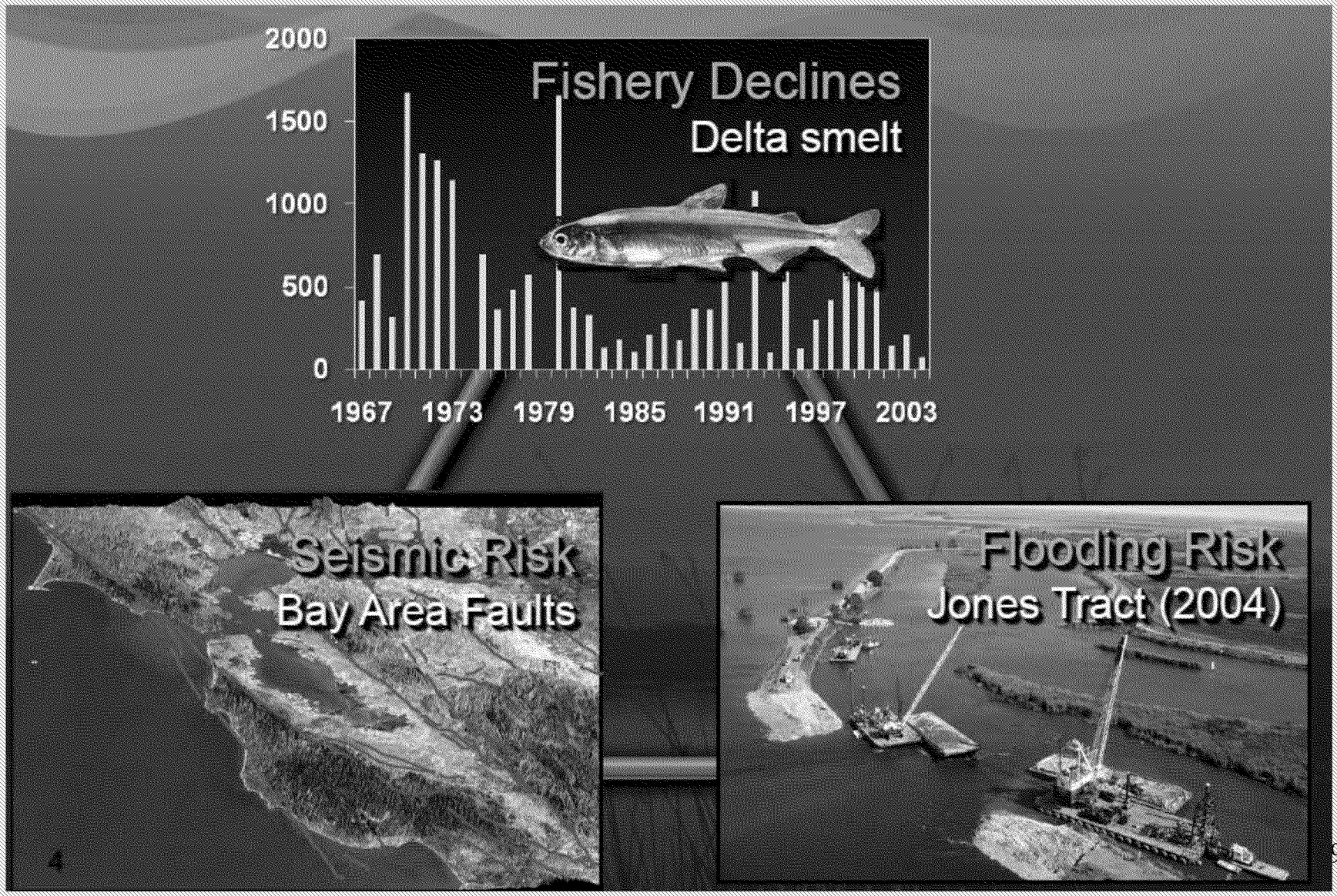
- 3 State Highways
- Major Rail Lines
- Major Water and Natural Gas Pipelines
- 1 Critical Natural Gas Reservoir
- 2 Deep Water Ports
- Major Power Transmission Lines



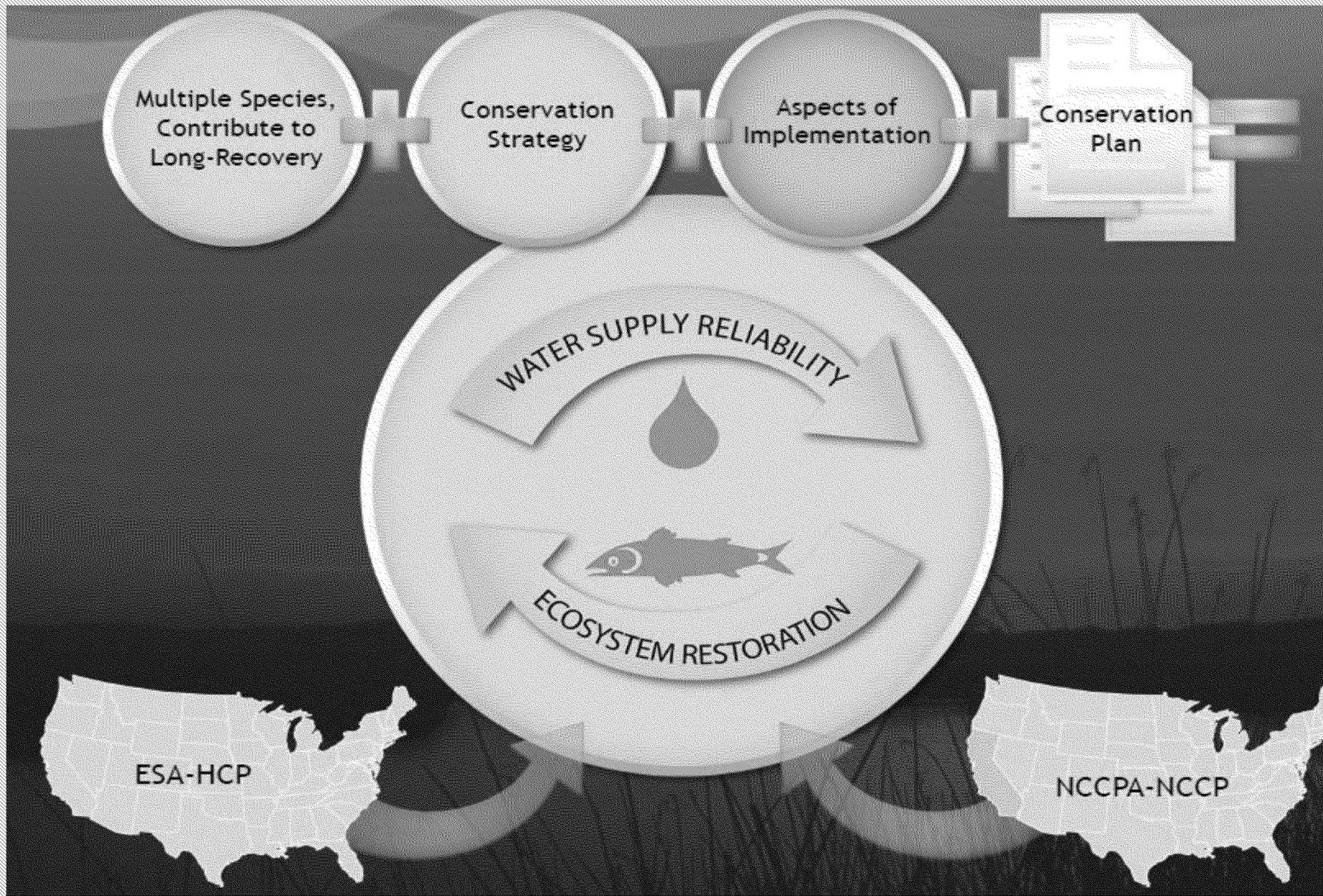
Importance of the Delta to California

- Water Supply
  - 25 million Californians
  - 3 million acres of agriculture
  - $400 billion of annual economic activity
- In-Delta Land Use
  - 558,000 acres in agricultural production
  - 64,000 acres of urban and commercial development
- Environment
  - Confluence of California's two largest watersheds (Sacramento River and San Joaquin River)
  - More than 750 plant and animal species
  - More than 40 threatened or endangered species

Key Delta Risks



What is BDCP?


Multiple Species, Contribute to Long-Recovery
Conservation Strategy
Aspects of Implementation
Conservation Plan
WATER SUPPLY RELIABILITY
ECOSYSTEM RESTORATION
ESA-HCP
NCCPA-NCCP

Importance to Long-term Solution

- Comprehensive ecosystem approach
- Better separates water delivery system from the Delta estuary
- Extensive tidal marsh and flood plain habitat
- Improves Delta flows
- Addresses other stressors - predation, invasive species, pesticides, toxins

Covered Species

DELTA SMELT

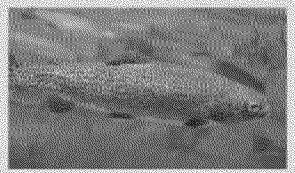
LONGFIN SMELT

CHINOOK SALMON

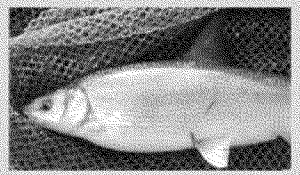
winter, spring, fall and late fall

GREEN AND WHITE STURGEON

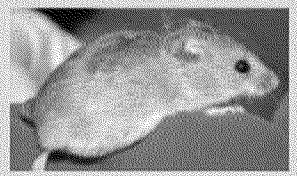
CENTRAL VALLEY STEELHEAD



SACRAMENTO SPLITTAIL



APPROXIMATELY 50 TERRESTRIAL SPECIES



BDCP Outline

Chapter 1. Introduction

Chapter 2. Existing Ecological Conditions

Chapter 3. Conservation Strategy

Chapter 4. Description of Covered Activities

Chapter 5. Assessment of Impacts and Level of Take

Chapter 6. Plan Implementation

Chapter 7. Implementation Structure

Chapter 8. Implementation Costs and Funding Sources

Chapter 9. Alternatives Considered and Rejected

Chapter 10. Independent Science Advisory Process

Chapter 11. List of Preparers

Chapter 12. References

Appendices

3.1 Introduction

3.2 Biological Goals and Objectives

3.3 Approach to Conservation: Overview of Key Conservation Measures and Their Integration

3.4 Conservation Measures

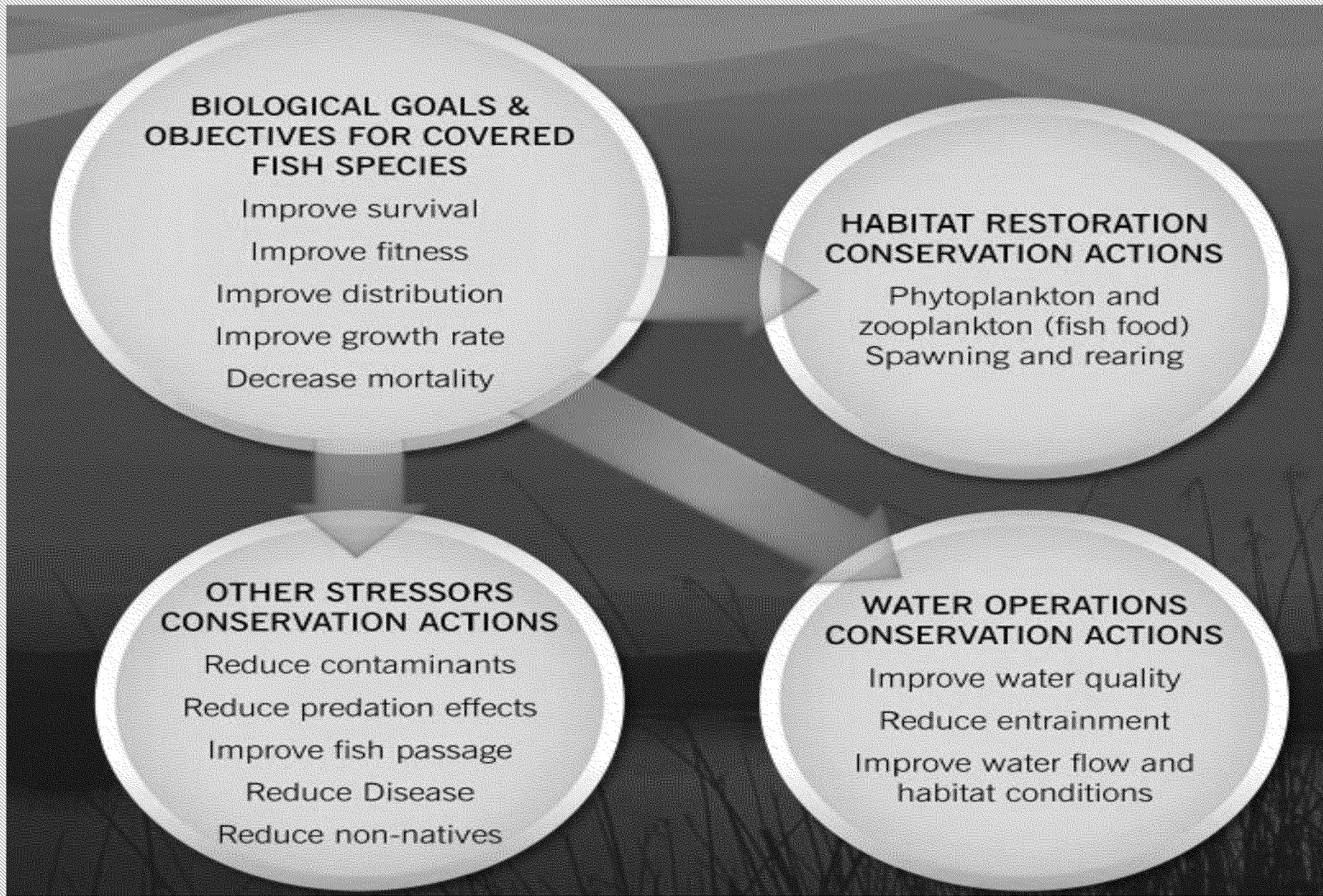
3.5 Monitoring Plan

3.6 Adaptive Management Program

3.7 Summary of the Approach to Minimization and Mitigation of Effects

3.8 Summary of Expected Outcomes for Covered Species and Natural Communities

Aquatic Conservation Measures



Draft Conservation Strategy: Major Elements

HABITAT RESTORATION

- Up to 80,000 acres tidal marsh, riparian, and floodplain
- Enhanced floodplain in the Yolo Bypass-temporary inundation
- 20-40 linear miles channel restoration
- Up to 45,000 acres of terrestrial habitat

WATER FACILITIES & OPERATIONS

- North Delta diversion
  - Up to 5 intakes
  - Up to 15,000 cfs design capacity
  - Pipeline/tunnel subject of focused study in BDCP
  - Establish minimum flows to ensure healthy habitat and water quality
  - Minimize reverse flows
  - Provide freshwater outflow
  - Maintain water quality standards
  - Manage operating rules for flows at Delta Cross Channel
- Manage operating rules for flows at Rio Vista

OTHER STRESSORS

- Minimize methyl mercury
- Control non-native aquatic plants
- Reduce illegal harvest
- Establish hatchery and genetic management plans
- Support Delta and longfin smelt propagation programs
- Reduce predators
- Construct non-physical barriers to re-direct juvenile salmonids
- Improve dissolved oxygen levels in the Stockton Deep Water Ship Channel

Schedule

- Administrative Draft BDCP (incl. Effects Analysis): February 27, 2012
- Public Draft BDCP: Expected late June 2012
- In meantime:
  - Releasing revised working draft chapters
  - Releasing working draft Appendices of Effects Analysis

BDCP Chapters

- Ch. 1: Introduction (Jan. 2012)
- Ch. 2: Existing Conditions (Sept. 2011)
- Ch. 3: Conservation Strategy (Admin Draft)
- Ch. 4: Covered Activities (Oct. 2011)
- Ch. 5: Effects Analysis
- Ch. 6: Implementation (Nov. 2011)
- Ch. 7: Implementation Structure (Sept. 2011)
- Ch. 8: Cost and Funding (Cost – Dec. 2011)
- Ch. 9: Alternatives to Take (Nov. 2011)
- Ch. 10: Scientific Input (Aug. 2011)

Revised Working Draft to Agencies

BDCP Chapters

- Ch. 1: Introduction (Jan. 2012)
- **Ch. 2: Existing Conditions** (Sept. 2011)
  - No substantial issues

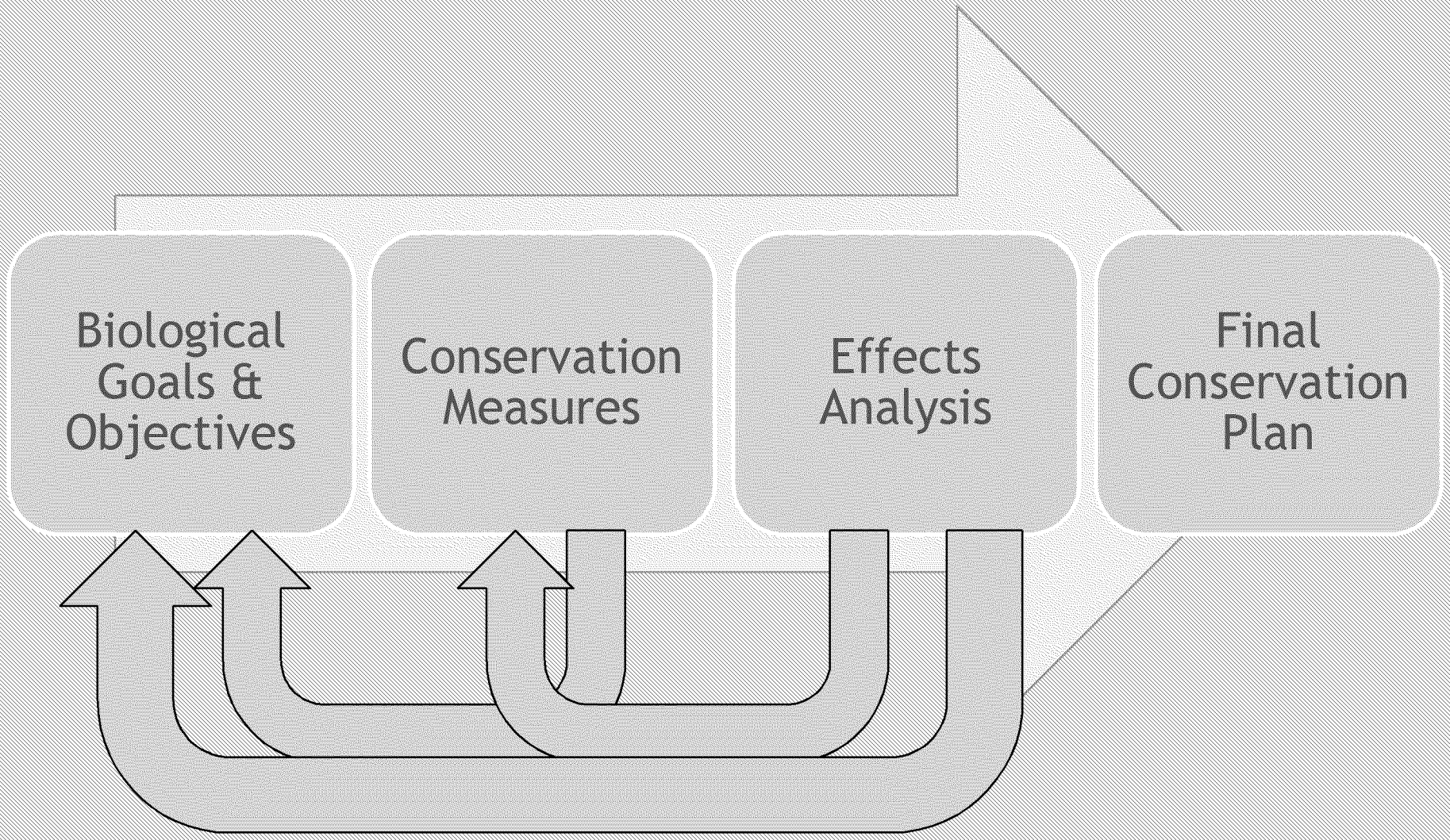
Chapter 3: Conservation Strategy

- Substantial revision from Nov. 2010 working draft
- Revising biological goals and objectives
  - Aquatic – outside expertise
  - Terrestrial – Terrestrial Tech. Team
- Revising all Conservation Measures (CMs)
  - Yolo Bypass (CM 2)
  - South Delta (several CMs)
- Investigating new CMs for covered fish
- Revising Adaptive Management and Monitoring

Biological Goals & Objectives

- Consistent with goals and objectives of existing plans
- 3 functions in Conservation Strategy:
  - Articulate desired biological outcomes
  - Connect outcomes to long-term conservation
  - Provide metrics to measure progress

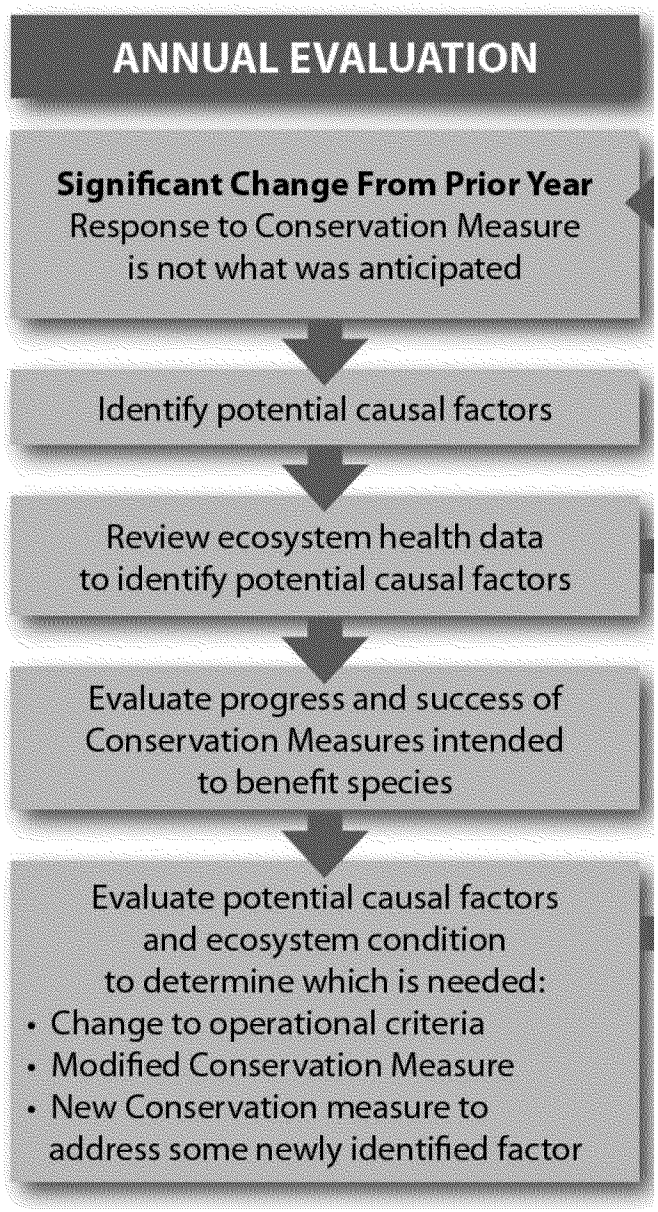
EA, G&Os, Conservation Measures



Adaptive Management and Monitoring Program

- Mechanism to adapt conservation strategies. The program will:
  - Prioritize key targeted research questions
  - Define process to adjust conservation measures
  - Define process to establish and adjust monitoring and research program
  - Define clear decision making process
- Balances need to be flexible but specific (e.g., existing monitoring programs)

Adaptive Management Process



BDCP Chapters

- **Ch. 4: Covered Activities** (Oct. 2011)
  - Level of detail of covered activities
  - Whether to cover near-term operations (unlikely)
  - Including screening of non-project diversions
- Ch. 5: Effects Analysis
- **Ch. 6: Implementation** (Nov. 2011)
  - Implementation schedule
  - Reporting and implementation of water operations
  - Changed circumstances (identity, definition, response)
  - Regulatory certainty for Reclamation (and federal water contractors)

BDCP Chapters

- Ch. 7: Implementation Structure (Sept. 2011)
  - Decision-making role for fish and wildlife agencies
  - Other authorized entities
- Ch. 8: Cost and Funding (Cost – Dec. 2011)
  - Cost of monitoring
  - Funding strategy (new)
- Ch. 9: Alternatives to Take (Nov. 2011)
  - Method of analysis
  - Identity of alternatives
- Ch. 10: Scientific Input (Oct. 2011)
  - No substantial issues

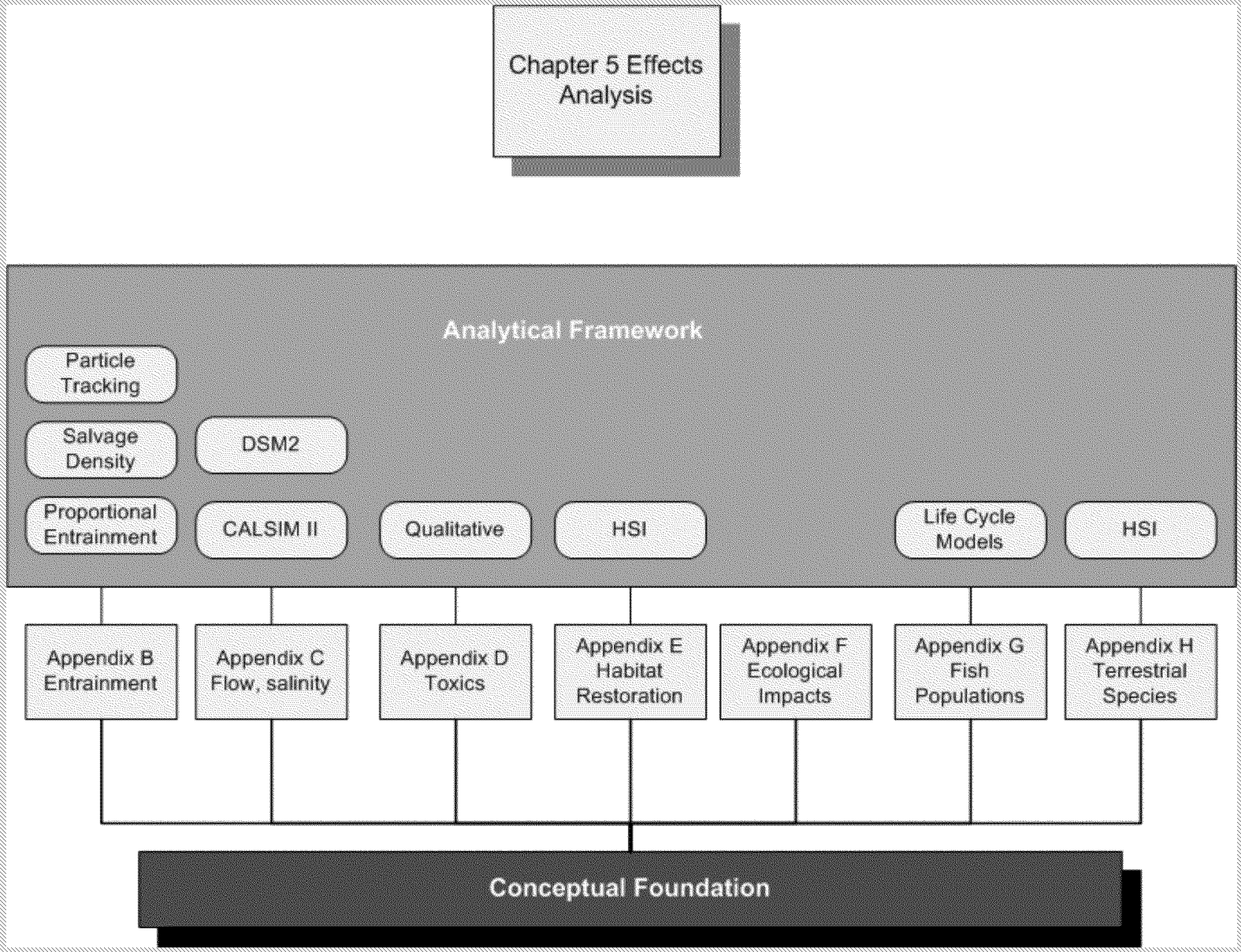
BDCP Effects Analysis: Overview and Status

Technical Appendix Status

- A: Conceptual Foundation and Analytical Framework (Sept. 2011)
- B: Entrainment (Sept. 2011)
- C: Flow, Salinity, Temperature (Oct. 2011)
- D: Toxins (Oct. 2011)
- E: Habitat Restoration (Jan. 13, 2012)
- F: Ecological Effects (Dec. 16, 2011)
- G: Fish Population (Nov. 2011)
- H: Construction Effects on Fish (Feb. 2012)
- J: Analysis Not Used (January 2012)

Revised Working Draft to Agencies

BDCP Effects Analysis

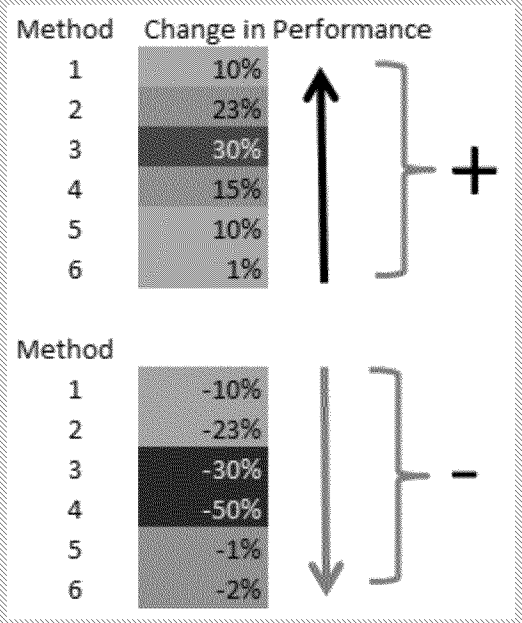


Models Used in the Effects Analysis

- Conceptual models
  - Capture ideas, organize analysis, describe assumptions
  - DRERIP, IEP, BDCP specific
- Environmental models
  - Evaluate environmental change
  - CALSIM II, DSM2
- Biological models
  - Evaluate environmental change in terms of species performance
  - Based on Environmental Models
- Habitat Suitability models
  - Evaluate habitat restoration
  - Weight restored habitat for species perception
- Population and life history models
  - Integrate flow/entrainment analyses

Reconciling Results from Multiple Analyses

- Weight of Evidence
  - Direction of change
- Evaluate
  - Reliability of methods
  - Direction of conclusions
  - Value of the metrics

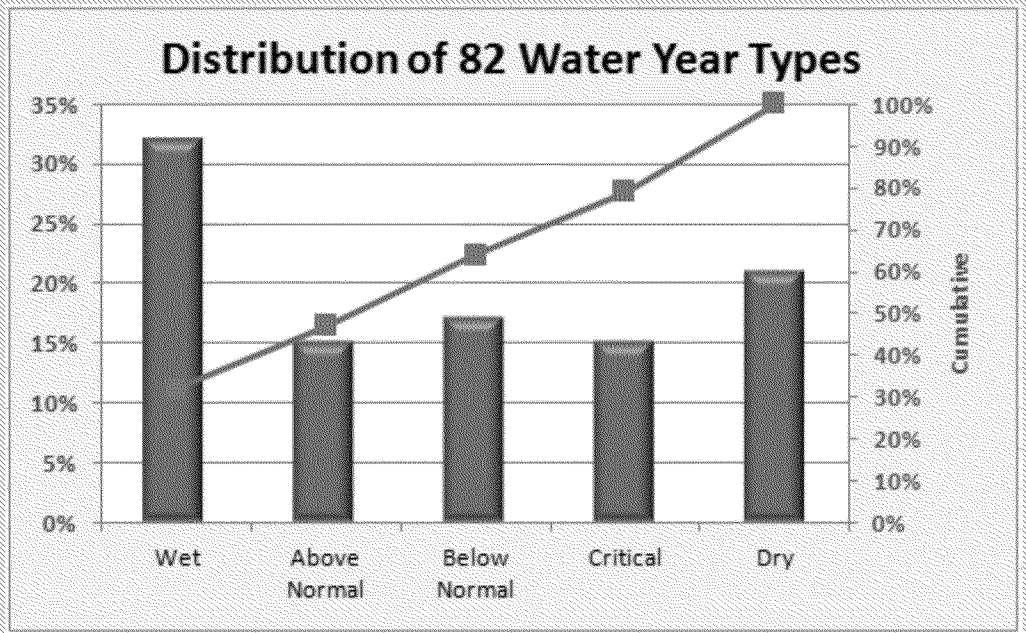


Factor	More Weight	Less Weight
Scientific credibility	Peer-reviewed in published literature	Unpublished with limited documentation
Usage	Widely used in the Delta or other systems (utility independently verified)	New and untested model (unverified)
Strength of conclusion	Highly statistically significant result or technically robust	Weak statistical significance or based on limited theory and data
Variability of results	Highly consistent results with different inputs (low uncertainty)	Highly variable results depending on inputs (high uncertainty)

BDCP Analytical Structure

Baseline Scenario	Regulatory Basis	Description
EBC1	CEQA	2008 USFWS BO and 2009 NMFS BO, but without Fall X2
EBC2	ESA Section 7 and NEPA	2008 USFWS BO and 2009 NMFS BO
PP	BDCP	BDCP Preliminary Project Description (19 Conservation Measures)

Description	Time Period
Early Long Term (ELT)	2025
Late Long Term LLT	2060



BDCP Focused Appendices

- A: Conceptual Foundation and Analytical Framework Appendix
  - Defines key concepts for and outlines the analysis (*analogy: the picture on the box of a jigsaw puzzle*)
  - Summarizes analytical and conceptual models
  - Science advisor report just out (and on App. B)
- B: Entrainment Appendix
  - Synthesizes and reorganizes the existing analysis related to entrainment
  - Revises previous existing analyses where necessary
  - Incorporates new, relevant analyses as available

BDCP Focused Appendices, Cont.

- C: Flow and Salinity, Temperature, and Passage Appendix
  - Analyzes effects associated with changes in flow
  - Describes flow modeling tools (CALSIM and DSM2) and species effects tools (Delta Passage Model)
  - Includes new analysis to examine the effects of improving Yolo Bypass upstream passage and providing a hydrograph closer to natural conditions
- D: Toxins Appendix
  - Addresses effects related to metals and pesticides
  - Focused analysis (many previous analyses not useful)

BDCP Focused Appendices, Cont.

- E: Habitat Restoration Appendix
  - Analyzes potential effects of proposed habitat restoration on physical parameters that affect covered species.
  - Use Habitat Suitability Indices (HSI) to provide biological rating of habitat conditions before and after BDCP actions
  - Focuses on quantity and quality of habitat and potential value to species and life stages
- F: Ecological Effects Appendix
  - Describes analysis and results of BDCP impacts on non-species specific biological factors that affect focal species
  - Identifies effects of predation, food supply, and submerged aquatic vegetation

BDCP Focused Appendices, Cont.

- G: Fish Population Analysis Appendix
  - Uses two methods: (1) existing species life-history models and (2) qualitative scoring of actions for species with such models
  - Population models limited to Chinook (winter and fall-run) and Delta smelt
- H: Construction Effects on Fish
  - Noise, habitat loss, sedimentation, etc.
- J: Analysis Not Used Appendix
  - Summarizes all methods used in Feb. 2011 Administrative Draft Ch. 5 but not retained in new draft
  - Explains why methods were not retained

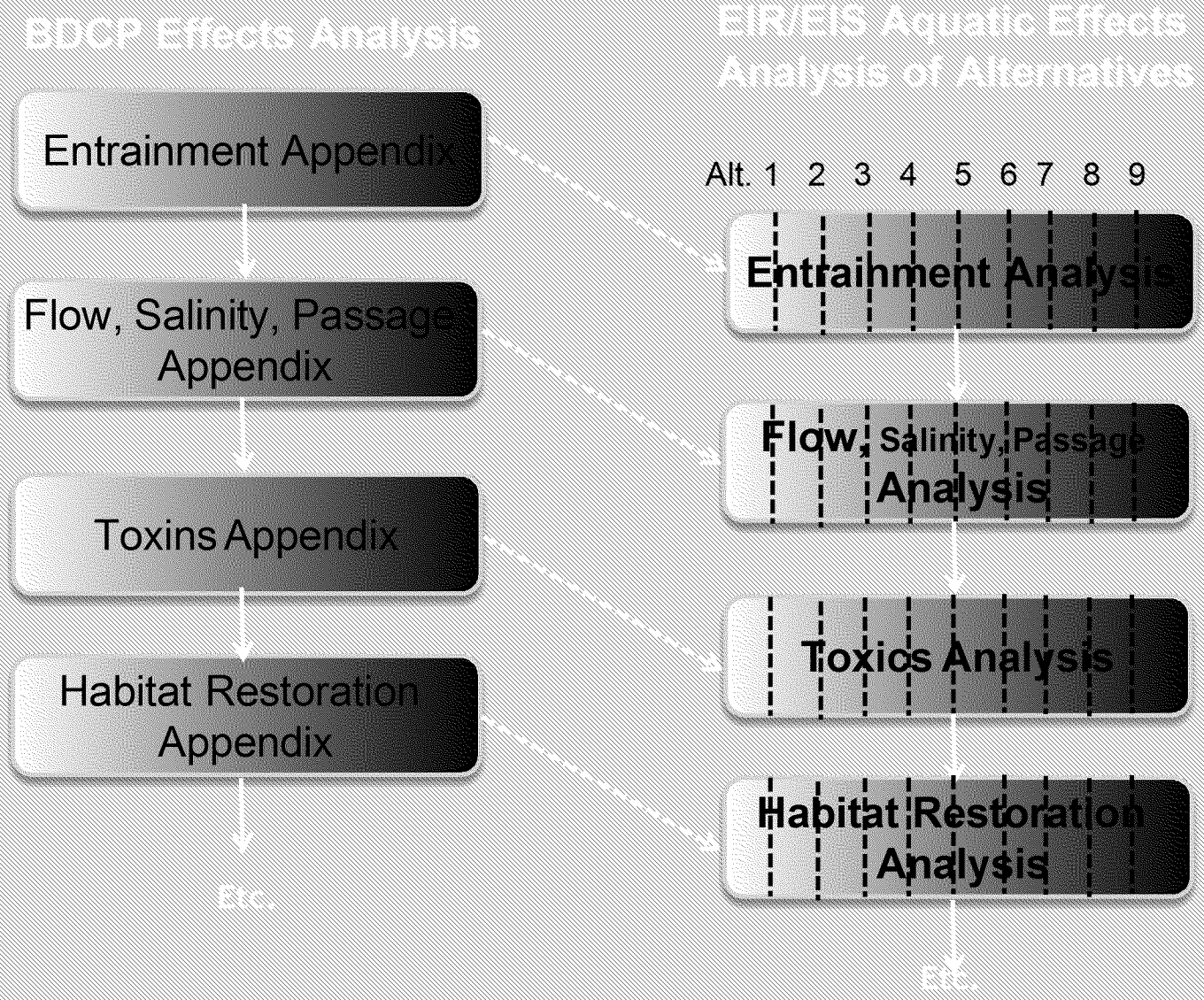
BDCP Effects Analysis Chapter

- Summarizes results from technical appendices
- Terrestrial Species Analysis (not in appendix)
  - Contains methods and results of GIS overlays
  - Contains new tables to clearly show results and show analysis of overlap of covered activities with western burrowing owl
  - Reflects revised conservation strategy
  - Building section with weekly deliverables to agencies

BDCP Effects Analysis Chapter

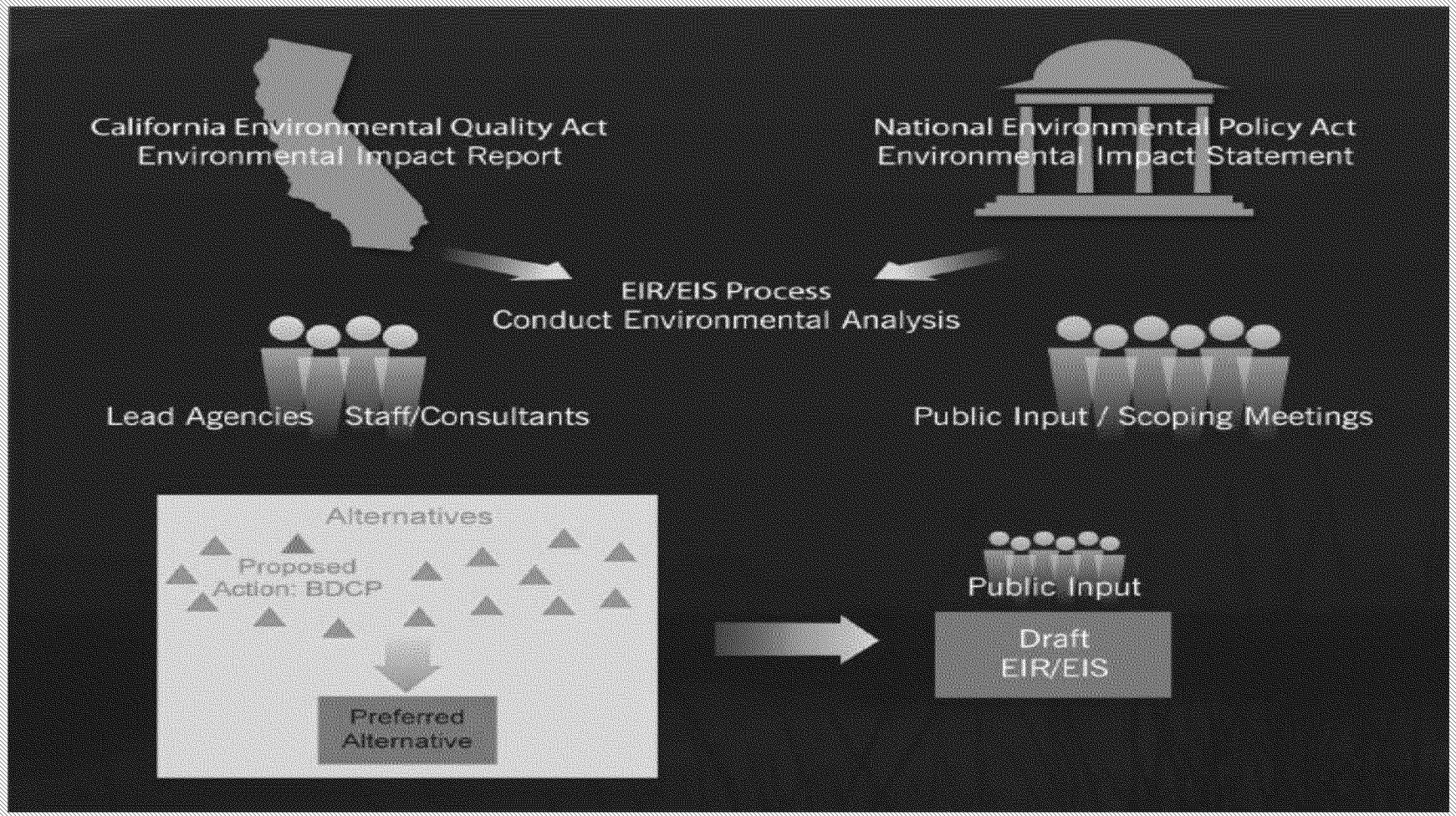
- Improved synthesis of effects ("roll-up")
  - Illustrations of magnitude of effects and changes to each stressor
  - Incorporate DRERIP results
  - Clear statements of effects and uncertainties
  - Acknowledge adaptive management
  - Evaluate feasibility of some biological objectives
- What the EA will not do
  - Measure contribution of conservation strategy against all biological objectives

BDCP Effects Analysis and Alternatives



The BDCP EIR/EIS

Environmental Review Process
Proposed Action: Bay Delta Conservation Plan



Environmental Review Process

The EIR/EIS will evaluate the effects of the conservation plan on both the natural (biological) and the human environment. This will include addressing impacts to:

- Water Supply
- Surface Water
- Groundwater
- Water Quality
- Geology and Seismicity
- Soils
- Fish and Aquatic Resources
- Terrestrial Biological Resources
- Land Use
- Agriculture
- Recreation
- Socioeconomics
- Visual Resources
- Cultural and Historic Resources
- Transportation
- Public Services and Utilities
- Energy
- Air Quality and Greenhouse Gas Emissions
- Noise
- Hazards and Hazardous Materials
- Public Health
- Mineral Resources
- Paleontological Resources
- Environmental Justice
- Climate Change
- Growth Inducement

EIR/EIS Lead Agencies

- CEQA Lead Agency
  - California Department of Water Resources
- NEPA Lead Agencies
  - Bureau of Reclamation
  - U.S. Fish and Wildlife Service
  - National Marine Fisheries Service

CEQA Responsible or Trustee State Agencies

- California Department of Fish and Game
- California Department of Parks and Recreation
- California State Water Resources Control Board
- Air Quality Management Districts
- California Department of Boating and Waterways
- California Department of Transportation
- California State Lands Commission
- San Francisco Bay Conservation and Development Commission
- Delta Stewardship Council

NEPA Cooperating Agencies

- U.S. Environmental Protection Agency
- U.S. Army Corps of Engineers
- State and Federal Contractors Water Agency
- Contra Costa, Sacramento, Solano, and Yolo counties
- North Delta Water Agency
- Reclamation Districts 3, 150, 550, 999

BDCP EIR/EIS

Alternatives

&

Approaches for Modeling

Identification of Initial Alternative Concepts

- Concepts in the Notice of Preparation and Notice of Intent
- Concepts identified during Scoping Process
  - Over 1,051 comments related to alternatives
  - Requests to include concepts described in 2007 and 2008 reports by Public Policy Institute of California
  - Request to include concepts presented to the Delta Vision Blue Ribbon Task Force
- Concepts included in BDCP Steering Committee handouts over past four years

All Initial Alternative Concepts include Three Components

- Restoration Components
- Measures to Reduce Other Stressors Components
- Conveyance Components
  - Isolated Conveyance
  - Dual Conveyance
  - Through Delta Conveyance

Isolated Conveyance Concepts

- Central Delta Pipeline/Tunnel from North or West Delta
- Eastern Unlined and Lined Canal from North or West Delta
- Eastern Unlined Canal plus connection to San Joaquin River near Mossdale
- Eastern Unlined Canal plus connection to EBMUD and SFPUC with possible connections to American, Calaveras, and Stanislaus river water rights holders
- Western Unlined and Lined Canal and Pipeline/Tunnel from North or West Delta
- Western Unlined Canal, Use of Sacramento Deep Water Ship Channel, and Pipeline/Tunnel
- Eastern Foothill Unlined Canal from Sacramento River near Verona

Dual Conveyance Concepts

- Central Delta Pipeline/Tunnel from North or West Delta
- Eastern Unlined and Lined Canal from North or West Delta
- Eastern Unlined Canal plus connection to San Joaquin River near Mossdale
- Western Unlined and Lined Canal and Pipeline/Tunnel from North or West Delta
- Western Unlined Canal, Use of Sacramento Deep Water Ship Channel, and Pipeline/Tunnel
- Eastern Foothill Unlined Canal from Sacramento River near Verona

Through Delta Conveyance Concepts

- Continued use of existing water supply systems
  - Levee armoring and new setback levees along South Fork Mokelumne and Middle rivers and Victoria Canal
  - Increased use of local and regional water supplies to reduce use of Delta water outside of the Delta
  - Manage Delta for habitat, not local or SWP/CVP water supplies
- Separate Corridors
  - Water supply corridor along Mokelumne and Middle rivers and fish movement corridor along Old River
- Use of existing water supply systems with Delta salt water barrier installed near Benicia Bridge

Multiple-Step Screening Criteria Process

- First and Second Screening Levels
  - Defining alternatives under CEQA and NEPA
- Third Screening Level
  - Defining "potentially feasible alternatives" under CEQA and "reasonable alternatives" under NEPA
- Consideration of Sacramento-San Joaquin Delta Reform Act requirements
- Consideration of criteria identified by CEQA responsible agencies and NEPA cooperating agencies raised during scoping

First and Second Screening Levels

- First Screening Level
  - Could the potential alternative concept meet the project's purpose/objectives in Notice of Preparation and Notice of Intent?
- Second Screening Level
  - Under CEQA, consider: Would the potential alternative avoid or substantially lessen any of the expected significant environmental effects of the proposed project?
  - Under NEPA, consider: Would the potential alternative address one or more significant issues related to the proposed action?

Third Screening Level

- Could the potential alternative concept be "feasible" under CEQA?
  - Capable of being accomplished in reasonable time period taking into account economic, legal, social, and technological factors?
- Could the potential alternative concept be "reasonable" under NEPA?
  - Practical or feasible from technical or economic standpoint?

CEQA and NEPA allow consideration of a reasonable balance of environmental, economic, social, and technical factors and legal feasibility under species protection and other laws

Consideration of Sacramento-San Joaquin Delta Reform Act

- Do alternatives provide a reasonable range of:
  - Flow criteria? Diversion rates?
  - Other operational criteria to satisfy the criteria of approval as a Natural Community Conservation Plan?
  - Hydrologic conditions?
- Does the range of alternatives include a:
  - Through Delta Conveyance alternative?
  - Dual Conveyance alternative?
  - Isolated Conveyance alternative?
  - Dual or Isolated Conveyance - Lined Canal alternative?
  - Dual or Isolated Conveyance - Unlined Canal alternative?
  - Pipeline/Tunnel Conveyance alternative?

Consideration of Responsible/Cooperating Agencies Scoping Comments

- Does range of alternatives include:
  - Broad range of water quality objectives and operational strategies?
  - Potential interim changes to SWRCB Bay-Delta Water Quality Control Plan?
  - Long-term changes to SWRCB Bay-Delta Water Quality Control Plan with and without new conveyance facilities?
  - Reduced diversions lower than diversions allowed in USFWS and NMFS biological opinions to assure continued existence of the species and some level of rehabilitation for estuary?
  - Delta outflows, and potentially inflows, that reflect a more natural hydrograph than current SWRCB Bay-Delta Water Quality Control Plan?

Current Range of Alternatives

Alternative	Alignment / Governance	Status	ID Investigation	Operation	Replacement
1A	Tunnel / deep	8	10,000 cfs	BNSF SL	BNSF SL
1B, 1C	East tunnel / deep West tunnel / deep	5	10,000 cfs	BNSF SL	BNSF SL
2A	Tunnel / deep	5	10,000 cfs	Scenario A w/ Fail #2	BNSF SL
2B, 2C	East tunnel / deep West tunnel / deep	5	10,000 cfs	Scenario A w/ Fail #2	BNSF SL
3	Tunnel / deep	7	6,000 cfs	BNSF Shortline Option	
4	Tunnel / deep	3	3,000 cfs	Scenario A w/Fail #2	BNSF SL
5	Tunnel / deep	1	3,000 cfs	NO BNSF SL 3D crossing ben	BNSF SL 20,000 cfs Flow Needs
6A	Tunnel / modified	8	10,000 cfs	BNSF SL w Fail #2 no 3D benefits	BNSF SL
6B, C	East tunnel / modified West tunnel / modified	5	10,000 cfs no 3D benefits	BNSF SL w Fail #2	BNSF SL
7	Tunnel / deep	5	9,000 cfs	BNSF SL, modified	BNSF SL, modified
8	Tunnel / deep	3	9,000 cfs	2 of 3 Fail #2	BNSF SL
9	Through Delta	6CC and Georgiana Slough closures, modified flows	10,000 cfs	BNSF SL	BNSF SL Closures in all

CALSIM II Overview

- CALSIM II is a general-purpose water resource systems model
  - Numerical representation of Central Valley system (SWP and CVP)
    - A simplification of the system it describes
    - Represents relationships among the components of a real-world system
    - Used to evaluate the system response to a given hydrologic input, operational criteria and any proposed actions or facilities to evaluate "what-if " scenarios
    - Supports planning processes to evaluate alternatives to meet a planning objective
- 82 year simulations (WY 1922 - 2003)
- Monthly timeseries outputs of flow, diversions and storage

DSM2 Overview

- DSM2 is a one-dimensional hydrodynamics, water quality and particle tracking model (HYDRO, QUAL and PTM)
- DSM2 represents Sacramento - San Joaquin Delta bounded by Sacramento, Vernalis and Martinez
- Channel bathymetry is represented by cross-sections defined by elevation - area - wetted perimeter tables
- Open water bodies represented as instantly mixed vertical tanks connected to Delta channels via nodes
- DSM2 planning simulations are generally run for 16 year period (WY 1976 – 1991)
- 15 min timeseries outputs of stage, velocity, flow, EC etc.

System Operations and Water Quality Integration

- CALSIM II simulates monthly system operations
- DSM2 predicts Delta hydrodynamics and salinity
- System operations often restricted by WQ requirements
- Artificial Neural Network:
  - mimics DSM2 flow-salinity relationships
  - provides rapid transformation of functional relationships to usable form for CALSIM II operations

BDCP Temporal Definitions that Affect CALSIM II and DSM2 Models

- BDCP Alternatives modeled at:
  - Early Long-Term (ELT) (2025)
  - Late Long-Term (LLT) (2025)

Factors	ELT (2025)	LLT (2060)
Sea Level Rise and Climate Change (Baselines and Alternatives)	15 cm Sea Level Rise Climate Change at 2025	45 cm Sea Level Rise Climate Change at 2060
Tidal Marsh Restoration (Alternatives, only)	25,000 acres of tidal marsh restoration	65,000 acres of tidal marsh restoration

Next Steps in Environmental Review Process

- Information Availability for Preliminary Draft
  - December 8, 2011: Batch A, B1
  - December 14, 2011: Batch B2
  - February 27, 2012: Batch C
- CEQA Agency Review Process for Administrative DEIR/S
  - February 27: Batch A and B transmitted for comment to Responsible and Trustee Agencies
  - May 9, 2012: Batch C transmitted for comment to Responsible and Trustee Agencies
- NEPA Agency Review Process for Administrative DEIR/S
  - February 27: Batch A and B transmitted for comment to Cooperating Agencies
  - May 9, 2012: Batch C transmitted for comment to Cooperating Agencies